DETERMINANTS OF BANKS' LENDING BEHAVIOR IN ETHIOPIA: PRAGMATIC EVIDENCE FROM COMMERCIAL BANKS (2004-2013)

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DETERMINANTS OF BANKS' LENDING BEHAVIOR IN ETHIOPIA: *PRAGMATIC EVIDENCE FROM COMMERCIAL BANKS (2004-2013)*

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ACRONYMS

ARDL - Auto-Regressive Distributed Lag

BLUE - Best Linear Unbiased Estimator

CBB - Construction and Business Bank

CBE - Commercial Bank of Ethiopia

CEE - Central and East European countries

CEMAC - Central African Economic and Monetary Community

CLRM - Classical Linear Regression Model

GDP - Gross Domestic Product

GMM - Generalized Method of Moments Estimation

NGDP - Nominal Gross Domestic Product

NPL - Non Performing Loans

OLS - Ordinary Least Square

RGDP - Real Gross Domestic Product

US - United States of America

VIF - Variance Inflation Factor

ABSTRACT

This study investigated main determinants of commercial banks' lending behavior in Ethiopian context by using panel data of eight banks over the period 2004 to 2013. It tested and confirmed the impact of internal and external factors on Ethiopian commercial banks' lending behavior. Since the data is secondary in nature, the quantitative approach was considered and besides, the fixed effect model was used. The fixed effect model was preferred over the random effect model based on the Hausman Specification test and thus, clustered robusted standard error were used to overcome the hetroscedasticity problem. The study considered bank loans and advances as outcome variable and bank specific factors (liquidity ratio, volume of deposit, credit risk and bank capital) as internal explanatory variables, and monetary policy instruments (cash reserve requirement and lending rate) and macroeconomic factors (GDP and annual foreign exchange rate of birr to USD) as an external explanatory variables. The results of fixed effect regression show that except liquidity ratio and lending rate which are significant at 5% level of significant, all bank specific factors are significant at 1% significant level. Thus, they have an impact on lending behavior of commercial banks in Ethiopia. On the other hand, macroeconomic variables (GDP and annual foreign exchange rate of birr to USD) and cash reserve requirement ratio does not affect the lending behavior of Ethiopian commercial banks. Based on the finding of study it has been suggested that Ethiopian commercial banks better to give an emphasis and employ various strategies so as to attract and seize deposits, establish applicable credit policies and arrangements and also critically consider the creditworthiness, rationing and performing ability of their debtors. Besides, they should focus to develop competent and proficient liquidity, credit risk and foreign exchange exposure management systems so as to diminish their negative impact on their lending performance.

Key words: lending behavior, loans and advances, volume of deposits, Ethiopia

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

The ultimate function of commercial banks is intermediation carried by accepting deposits from surplus units and then granting loans and advances for whom they need it (Kaaya & Pastory, 2013). Commercial banks are the most vital saving, deposit mobilization and resource allocation institutions in every economy. As a result, commercial banks have a big role in facilitating the economic growth of any country by fostering investment through their intermediation function for investors (Okoye & Ricahrd, 2013).

The Ethiopian financial sector is characterized by highly regulated, closed from foreign competition, rapid growing economy with shallow and low coverage financial service also the financial soundness indicators shows that Ethiopian commercial banks are profitable and stable (Zwedu, 2014). The banking industry play the most crucial role in facilitating capital accumulation and economic processes for developing countries since they are one of the critical component of the financial system (Ladime, Kumankoma & Osie, 2013; and Kassie, 2014). Banks are dominant in Ethiopian financial system which constitutes 95 percent share of assets, 97 percent of deposits, 94 percent loans and advances and 77 percent equity of the financial sector on average (Kassie, 2014). Nowadays there are about 19 banks which constitute one development bank and the remaining 18 are commercial banks.

Nwankwo (as cited in Olokoyo, 2011) stated that credit is the main source of single-income asset for most commercial banks. This is why every bank should pay deposit interest for depositors in lieu of using their money. Hence they charge loan rate from borrowers as expense of using their money. For generating interest income banks grant loans and advances for individuals, government and private firms by assuring profitability, liquidness and creditworthiness or solvency. The lending behavior of commercial banks is influenced

by different factors which can be included as endogenous (bank specific) and exogenous (industry specific or monetary policy and macroeconomic) factors.

According to Olokoyo (2011) and Olusanya, Oyebo and Ohadebere (2012) volume of deposit, investment portfolio, interest (lending) rate, cash reserve requirement ratio, liquidity ratio, annual foreign exchange rate to US dollar and GDP at current market price are the main factors that affect the lending behavior of commercial banks in Nigeria. Malede (2014) investigated the determinants of commercial banks' lending behavior in Ethiopian case by adding bank size on the above explanatory variables but foreign exchange rate was not included. Besides, Assefa (2014) examined short and long-run impact of bank-specific, monetary policy and macroeconomic variables on bank credit to private sector in Ethiopia; using supply-side approach over the period 1978/79-2010/11. Ladime et al. (2013) also examined and categorized these variables into bank characteristic, industry characteristic and macro-economic indicator.

Tightening of monetary policy usually leads to decrease the demand for deposits because banks adjust their deposit rates only partially to the changes in official rates. This, in effect drains liquidity from the banking sector to equity investment funds. Shrinking banks' liabilities forces banks to decrease the supply of loans given accordingly. Cash reserve ratio requirement, one of the monetary policy instruments, is minimum amount of customer deposits and notes that a central bank requires commercial banks to hold in central bank by their own account. This is why sometimes commercial banks face liquidity problem and this result in not fulfilling of their short term obligations. Therefore, it is an effective mechanism for controlling the risk of commercial banks by requiring them to deposit a reserve. According to Kimani (2013), holding excess reserve sometimes has an advantage of smooth operation payment system. Olokoyo (2011); Olusanya et al. (2012) and Araga (2014) investigated that cash requirement reserve ratio have a direct or positive relation between banks' lending behavior in Nigeria. On the other hand, based on Malede (2014) finding in Ethiopian case cash required reserve ratio have no influence on lending behavior of commercial banks. In addition to this, Assefa (2014) found a significant relation between volume of deposits and Ethiopian banks' lending to private sector but Malede

(2014) founds a positive and statistically insignificant relation between volume of deposit and lending behavior of Ethiopian banks.

Monetary policy instruments of Ethiopia are improved several times. For instance, the Reserve Requirement Directive is improved four times. Directives No. SBB/45/2008 which is called " Reserve Requirement - 4th Replacement " states that any bank operating in Ethiopia shall at all times maintain 15% (fifteen percent) of all Birr and foreign currency deposit liabilities held in the form of demand (current) deposits, saving deposits and time deposits. These changes of monetary policy instruments have its impact on the loan and advances of commercial banks.

In addition to monetary policy instruments, like other country banks Ethiopian commercial banks' lending behavior is affected by bank specific and other macroeconomic factors. The variables included in Malede (2014) are volume of deposits, bank size, gross domestic product, credit risk, liquidity ratio, cash reserve ratio, investment portfolio and interest rate. The results of this study showed that bank size, credit risk, GDP and liquidity ratio have a positive and statistically significant influence on banks' loan and advances. On the other hand cash reserve ratio, commercial banks' lending rate and investment portfolio have positive but statistically insignificant impact and volume of deposit has positive but statistically insignificant impact on lending behavior of Ethiopian commercial banks.

Therefore, this paper was empirically investigate most determinants of Ethiopian commercial banks' lending behavior either private sector or government by incorporating the additional two variables (bank capital and foreign exchange rate).

Furthermore, Since Ethiopian banking sector has shown a rapid progress in terms of number of commercial banks, total assets and capital, widening their branch network, increasing their outreach to remote areas and continuously reporting profits of different magnitude, the examination of the determinants of commercial banks' lending inclusively was very necessary.

1.2. Statement of the Problem

Empirical studies elsewhere in the world shows that commercial banks play a vital role for the development of every economy (Kaaya & Pastory, 2013). This role is due to their primary activity of channeling individuals, businesses, households and government who have surplus money and granting it in the form of loans and advances for the needed. In addition to this, commercial banks provide other services like transferring of money, liquidity service, project evaluation, risk management etc.

The lending function of commercial banks is influenced by different internal and external factors. According to Richard and Okoye, (2014) internal factors of lending behavior of banks are established by their directors while external factors arise from the regulatory actions of national (central) banks, other regulatory authorities in the financial sector of the economy and from the general macroeconomic event. Scrutinizing these major factors that affect the lending behaviors of commercial banks is the critical task of different parties. In different countries of the world, several studies were conducted to inspect the determinants of lending behavior of commercial banks. For instance, Olokoyo (2011); Olusanya et al. (2012); Ladime et al. (2013); Tomak (2013) and Richard and Okoye (2014) investigate factors that are classified as internal and external. On the other hand, some scholars try to address and emphasis in examining macro-economic factors of loans and advances (He & Wang, 2012). Some researchers examine single explanatory variables in depth rather than scrutinize all in one; Gambargortha and Mistrulli (2003) studied the influence of bank capitalization on banks channeling in Italy case.

The finding of Olokoyo (2011) and Olusanya et al. (2012) shows there is a positive relationship between loans and advances and annual average exchange rate in Nigeria. In addition, Kishan and Opiela (2000) confirm a bank capital have a great impact on their lending behavior. These three studies show that bank capital and annual foreign exchange rate are determinant variables for the loan and advances of commercial banks.

To the best knowledge of the researcher searching from internet and journals except Assefa (2014) and Malede (2014) there is no study conducted to examine the determinants of Ethiopian commercial banks' lending behavior on supply side.

Assefa (2014) found that domestic deposits, foreign liabilities, real lending interest rate, M2 as percentage of NGDP, GDP and inflation have significant impact on banks credit to the private sector in the long-run. On the other hand Malede (2014) also founds bank size, credit risk, GDP and liquidity ratio have a positive and statistically significant relationship with Ethiopian commercial banks' lending. On the other hand he also founds cash reserve ratio, commercial banks' lending rate and investment portfolio have positive but statistically insignificant relation with bank lending in Ethiopian banks.

However, these variables (bank capital and annual foreign exchange rate) are not included on the study made by the above studies except bank capital included by Assefa (2014). But the study of Assefa (2014) is only focused on credits given for private sector.

Therefore, the main purpose of this study was to examine determinants of lending behavior of Ethiopian commercial banks. Based on the previous discussion this study fills the gap first by incorporate bank capital and annual foreign exchange rate as an independent variable and second it examine lending's made for private and non-private sectors besides it covered a ten year latest data from 2004 to 2013.

Finally, the study answered the following questions.

- Do endogenous factors affect the bank lending of Ethiopian commercial banks?
- Do industry specific factors affect the lending behavior of Ethiopian commercial banks?
- Do macroeconomic factors affect the lending behavior of Ethiopian commercial banks?

1.3. Objectives of the Study

1.3.1. General Objective

In response to the problem identified above, the major objective of the study was to examine the main determinants of lending behavior of Ethiopian commercial banks.

1.3.2. Specific Objectives

More specifically, the study addressed the following specific objectives.

- To examine the impact of endogenous factors on commercial banks' lending behavior.
- To examine the impact of industry specific factors on commercial banks' lending behavior.
- To examine the impact of macroeconomic factors on commercial banks' lending behavior.

1.4. Research Hypothesis

Commercial banks' lending behavior was hypothesized to be a function of both internal (bank-specific) factors and external (industry related and macroeconomic) factors. Based on the research objective the researcher develops the following arguments.

Hypothesis I:

H_o: There is no significant impact of endogenous factors - (credit risk, liquidity ratio, volume of deposits and bank capital) on commercial banks' loans and advances.

H_1: There is significant impact of endogenous factors - (credit risk, liquidity ratio, volume of deposits and bank capital) on commercial bank loans and advances.

Hypothesis II:

H_o: There is no significant impact of industry specific factors - (cash reserve requirement & average lending rate) on commercial bank loans and advances.

H_1: There is a significant impact of industry specific factors - (cash reserve requirement & average lending rate) on commercial banks loans and advances.

Hypothesis III:

H_0: There is no significant impact of macroeconomic factors - (GDP and foreign exchange rate) on commercial bank loans and advances.

H_1: There is a significant impact of macroeconomic factors- (GDP and foreign exchange rate) on commercial banks loans and advances.

1.5. Significance of the Study

This research was carried out to provide empirical evidence on the factors of lending behavior of Ethiopian commercial banks'. The researcher aims that the finding of the paper is important for different stakeholders. The foremost importance of the result of the study is for commercial banks, knowing the main and latest factors with their degree of influence on lending decision will benefit them to take appropriate actions before and after the factors are happened depending upon the situation and the nature of that specific factor. Additionally, better understanding of the effect of determinants of commercial bank lending also will benefit government bodies to adjust different policies and regulations (i.e. related to cash reserve requirement, capital requirement, sometimes exchange rate determination and interest rate) and to caring on the modification process of policies. Furthermore, the study adds something on the existing knowledge related to subject matter. The finding of the study is used as a basis for researchers and academicians to conduct further investigation in the related areas.

1.6. Scope of the Study

The research was limited to examine the determinants of lending behaviors of Ethiopian commercial banks. In order to include full year data of sampled banks the study exclude newly established banks in the study period and it was focused on all commercial banks that were established before year 2004. This paper did not investigate the lending behavior of Development Bank of Ethiopia because as indicated before on the topic, the research stands to study the lending behavior of commercial banks only. Besides it was limited to investigate only the impact of eight explanatory variables i.e. credit risk, liquidity ratio,

cash reserve requirement ratio, GDP, average lending rate, foreign exchange rate, volume of deposits and bank capital.

1.7. Organization of the Thesis

The rest of the paper is organized as follows: the second chapter consist literature review part of theoretical framework and empirical studies discussions and their summary. Chapter three contains the research design, the population and method of sampling, methods of data collection and modeling and, method of data analysis and description of variables. The fourth chapter contains diagnostic tests, the process of model selection, data analysis and discussion of the results. Finally, in the last chapter main findings of this thesis were concluded and appropriate recommendations were suggested.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Introduction

This section of the paper contains reviewed literatures presented by various scholars that are related to the objectives of the study. Various theoretical concepts and empirical study are discussed and finally the summary of the reviewed literatures are presented.

2.2. Modern Banking History in Ethiopia

The first bank established in Ethiopia was the Bank of Abyssinia in 1905. It was owned and managed by the British-owned National Bank of Egypt (Harvey, 1996). It was given a banking monopoly for fifty years, including the right to issue notes and coins. However, three other banks were established in the next ten years. In 1931, the Bank of Abyssinia was replaced by the Bank of Ethiopia which was wholly owned by the government and members of the Ethiopian aristocracy, becoming the first 100% African-owned bank on the continent; it was also authorized to issue notes and coins and to act as the government's bank. It operated for only a few years, being closed after the Italian invasion. During the Italian occupation, several Italian banks opened branches in Ethiopia (Ibid).

After the liberation the Ethiopian government established the 'State Bank of Ethiopia' in 1943 and operates the banking activity by 43 employees in two branches. The bank was act as both a central bank and a commercial bank of the country.

In 1963 a new banking law split the functions of the State Bank of Ethiopia into central and commercial banking as the National Bank of Ethiopia and the Commercial Bank of Ethiopia respectively, both were government-owned. The 1963 banking law was allowed for other commercial banks (foreigners) to operate (Ibid).

After the fall of the imperial government in 1974, these led to a major change in economic policy. The nationalization of all large corporations was one the instrument for establishing centralized control (Ibid). Ownership of financial institutions was main concern and for

this reason private sector commercial banks were nationalized and concentrated into the Commercial Bank of Ethiopia (CBE). The new Ethiopian government merely shifted, therefore, from owning most of the banking system to owning it completely.

After the fall of socialist government, the private sector involvement in the banking industry started with the virtue of the monetary and banking proclamation No. 83/1994. Currently there are 19 licensed banks which operate in Ethiopia. Out of this 3 banks are owned by the central government namely Development Bank of Ethiopia (DBE), Commercial Bank of Ethiopia (CBE) and Construction and Business Bank (CBB) which carry out commercial activity like private banks. The remaining 16 banks are privately owned commercial banks. All the banks are now regulated by the National Bank of Ethiopia. The National bank of Ethiopia plays the most influential role in the country's economic and financial development. It acts as a banker and financial advisor to the government as the nation's monetary authority and is responsible to the government for promoting monetary stability in the country.

2.3. Theoretical Review

Signaling Argument

Better companies offer more collateral to signal themselves to the bank a best borrower and in turn to be charged by the bank a lower interest rate because a good firms know they will not suffer severely from offering more collateral ever since, the chance of conditions are violated (Ewert & Schenk, 1998). Chodachai (2004) states that low risk borrowers, prefer contracts with high level of collateral. In other expression, the low-risk firms offer more collateral to give a signal to the lending banks that their business is very promising i.e. the collateral is not likely to be repossessed because default is highly unlikely to occur. Therefore, according to the theory, since more collateral pledged firms seen as a better, they are charged lower interest rates by banks (Chodachai, 2004).

Credit Market Theory

Model of neoclassical credit market suggests that the terms of credits clear the market. If collateral and other restrictions (covenants) remain constant, the interest rate is the only

price mechanism of credit with an increasing demand for credit and a given customer supply, the interest rate rises, and vice versa (Ewert, Schenk & Szczesny, 2000).

Loan Pricing Theory

Interest rate premium is set based on the risks. If firms are riskier they would require paying higher interest rates. However, setting higher interest rate will draw riskier applicants (adverse selection problem) and/or initiate borrower firms to spend in riskier projects to charge a higher interest rates to compensate the earlier concessions (moral hazard problem) (Petersen, 1999). Hence the bank's expected losses may no longer covered by the higher interest rate and this lead banks choose not to lend (Stiglitz & Weiss, 1981; Petersen, 1999).

2.4. Empirical Review

The evolution of bank lending theoretically results from the interaction between demand and supply factors. However, the variables that help to explain the dynamics of the loans sometimes affect both demand for and supply of credit, and it is not always, accordingly, possible to empirically identify the two channels. Hence, to identify the factors of commercial banks literatures are found in two sides (demand factors and supply factors) in different countries. There are usually variables of scale, variables related to financing conditions, variables related to the position of households and corporations and factors related to structural changes in the banking sector and other variables. Even though, there are many factors in both sides of credit the focus of the paper is in examining supply side factors.

Many literatures suggest that the bank lending is a function of different determinants emanated from internal and external environment of banks. Internal factors are bank specific whereas external factors are originated from monetary policy, economic situations and legal environment in which their impact is to the whole economy and industry.

Ewert and Schenk (1998) observed big companies that provide more collateral sends some signals to convince banks that they are less risky customers, with the hope type of securing lower interest rates. This is not the case with high risky companies that are required to

comply with provision of collaterals and restrictive covenants, and yet are still charged higher interest rates on loan facilities. The shortcomings in this study include; consideration of interest rate as the only factor affecting bank lending behavior, and the fact that the study is based on German economy.

Gambacorta and Mistrulli, (2003) also investigates the existence of cross-sectional differences in the response of lending to monetary policy and GDP shocks due to a different degree of bank capitalization. The study used a unique dataset of quarterly data for Italian banks over the period 1992-2001. The study found that well-capitalized banks can better shield their lending from monetary policy shocks and this is consistent with the "bank lending channel" hypothesis, an easier access to non-deposit fund raising. A "bank capital channel" is also detected, with higher effects for cooperative banks that suffer a higher maturity mismatching. It also found that capitalization also influences the way banks react to GDP shocks. Again, the credit supply of well-capitalized banks is less pro-cyclical. The introduction of a specific solvency ratio for highly risky banks determines an overall reduction in lending.

Chodechai (2004) investigated factors that affect interest rates, degree of lending volume and collateral setting in the loan decision of banks. Chodechai also suggested that banks have to be careful with their pricing decisions as regards to lending as banks cannot charge loan rates that are too low because the revenue from the interest income will not be enough to cover the cost of deposits, general expenses and the loss of revenue from some borrowers that do not pay.

The emphasis of the study is on mainly on the influence of interest rates on lending behavior of banks to the neglect of other significant factors that affect the behavior of commercial banks in lending generally. Furthermore, the study is based on a distinct economic clime with peculiar regulatory framework and banking practices which are different from what obtains in Nigeria's banking industry. However, this study is based in the context of what obtains in another economy.

Abdul Karim, Wan Ngah and Abdul Karim (2010) investigated the relevance of bank-lending channel (BLC) of monetary policy in a small-open economy, i.e. Malaysia by using disaggregated bank level data set. A dynamic panel data method namely GMM framework have been used in estimating the dynamic of banks' loan supply function. The empirical evidence has stated that monetary policy shocks is significantly and negatively influenced the banks' loan supply, and therefore has supported the existence of BLC in Malaysia. In addition, the study found that bank-characteristics variables namely bank liquidity and bank capitalization are statistically significant in influencing the banks' loan supply. The study concludes that the implementation of monetary policy is effective in influencing economic activity via bank balance sheet position, in particular bank loans.

On their study of industry specific effect of reserve requirement, Glocker and Towbin (2011) states that in order for reserve requirement changes to have a real effect, two conditions need to be fulfilled: The first condition is that deposits cannot be substituted easily as a funding source. Otherwise, banks could compensate the higher deposit funding costs by other financing means such as wholesale funding. The second condition is that firms cannot substitute bank credit with other financing sources easily. If bank lending could be substituted easily, a reserve requirement increase would lead to a decrease in bank credit that would be compensated by an increase in other types of liabilities, for example capital market funding, leaving investment decisions and private sector assets unaffected.

The study made by Takats (2010) examined the bank lending behavior and empirically found that during the financial crisis the cross-border bank lending declined sharply. Using the data of twenty-one emerging markets, he concluded that during the financial crises the demand and supply factors contributed to the fall in bank lending, but the impact of supply factors were dominated. However, both the factors appear to have more balanced effects in pre-crisis period. Furthermore, supply shock was the key determinant of slowdown in cross border lending to emerging economies. The credit growth before the crisis was vastly different across countries and regions.

The study was conducted by Olokoyo (2011) to test and confirm the effectiveness of common determinants of commercial banks' lending behavior and their effects on lending in Nigerian banks from the period 1980-2005. The study used secondary data of the whole population. Multiple regression analysis of Ordinary Least Squire (OLS) method and various tests like Unit Rot Test using Augmented Dicky-Fuller (ADF) technique, the Johansen's Multivariate co-integration test which short run and long run relation between the variables and Vector Error Correlation Estimates were employed and E-Views 5.1 package used for analysis in the paper. The finding of the study showed that volume of deposit, investment portfolio, interest rate, cash reserve ratio, liquidity ratio, foreign exchange rate and Gross Domestic Product have a long run relationship. As indicated on the result the above all variables of the study have a positive relationship with loans and advances of commercial banks. However, liquidity ratio, interest rate and cash reserve requirement ratio are insignificant at all levels (1%, 5%, and 10%). On the other hand banks' lending behavior is significantly influenced by volume of deposit, investment portfolio, GDP and foreign exchange rate. Furthermore, deposit volume has the highest impact and influence on the lending behavior of Nigerian commercial banks and any change in it will yield the highest change in loans and advances. Olokoyo also suggested that commercial banks should focus on mobilizing more deposits as this will enhance their lending performance and should formulate critical, realistic and comprehensive strategic and financial plans.

The study by Djiogap & Ngomsi (2012) investigated the determinants of banks long term lending behavior of Central African Economic and Monetary Community (CAEMC) for the period of 2001-2010. This study tries to test common bank level and macroeconomic determinants of bank long term loan behavior. The panel data of six central African countries sample banks used and 9 independent variables included in the study. The result of the study showed that bank size, GDP growth and capitalization continue to play an important role in determining the bank's willingness and ability to lend to businesses long term. The coefficients on these explanatory variables remain positive and highly statistically significant, indicating that larger banks and better capitalized banks tend to extend more long-term credit to firms than smaller and less capitalized banks. These

results underlined the importance of supply side constraints in extending vital long-term credit to firms. The multivariate test of cross-countries differences in the bank lending decisions suggest that smaller banks, less capitalized banks, banks with low levels of long term funding sources, banks with higher nonperforming loans and operate in recession environment are more averse to lend long term. The study suggested that larger capital banks have a potential to extend long term which are considered as risky loans, since their capital protect them from credit risk.

Imran and Nishat (2012) investigated the determinants of the bank credit by using time series data from 1971 to 2010 in Pakistan. The empirical result indicated that the foreign liabilities, domestic deposits, economic growth, exchange rate, and the monetary conditions have significant impact on banks credit to the private sector in Pakistan, particularly in the long run. Whereas the inflation and money market rate do not affect the private credit. In conclusion, the determinants of bank lending behavior literature indicate that bank level (size, capitalization, ownership structure and access to funds) and market-based (interest rate, inflation rate, GDP) variables' impact bank lending behavior in different ways in different countries. The results of the study showed that the foreign liabilities, domestic deposits, economic growth, exchange rate, and the monetary conditions of the country are the factors which significantly affect the banks for credit issuance to the private sector in the long run. Whereas the inflation and money market rate does not affect the private credit. In this context, bank lending behavior varies according to the dynamics and the institutional background of the country. The results the study infer that the financial health and liquidity of the banks play a significant and vital role in the determination of loan. A strong economic condition measured by GDP, as motivating factor to banks has statistically significant impact on issuance of more private credit to businesses.

The study of Tomak (2013) which studied the bank-level (size and access to funds) and market-based (interest rate, inflation rate, GDP) variables' impact on bank lending behavior in Turkey using quarterly bank level data of 15 private commercial banks and 3 state-owned banks for the period of 2003-2012. The aim of this study was to identify the factors which explain the bank credit to the businesses in varying financial environments.

According his finding, banks' business lending behavior depends on its size, total liabilities, nonperforming loans to total loans (NPL) and inflation rate. The result shows that private banks with a robust banking structure exhibit better lending performance than the state-controlled banks. Besides, private-owned banks have higher share both as asset and loan types in the Turkish banking system in comparison with the foreign-owned and state controlled banks. De Resende, Dib & Perevalov (2010) argue that an increase in the minimum capital requirement applied to the domestic banking system affects the economy through the marginal cost of loan supply, as banks need more "input" (capital) to produce one unit of "output" (loans). The higher minimum capital requirement forces banks to reduce loans provided or raise additional bank capital. When banks deleverage by cutting loans, investment is directly affected and falls, followed by GDP. When deleverage implies costly capitalization, the extra cost is transferred to borrowers through a higher lending rate, which has a negative effect on entrepreneurial net worth and leads to an increase in risk premium (spreads), pushing the firms' external financing costs up. Thereby, this indirect channel also produces a fall in domestic investment and GDP. Resende et al. (2010) concluded that a permanent increase in both the minimum capital requirement and in the liquidity requirement would produce small, permanent reductions in bank lending and GDP, and permanent increases in both the spreads of the lending rates and the external financing cost over the policy rate. The response of monetary policy matters greatly for the implications of the changes in capital and liquidity requirements. According to this study, the reaction of monetary policy to the fall in economic activity and inflation is limited and the effect of the change in regulation is much stronger.

The main objective of Ladime et al. (2013) was to examine the determinants of bank lending behavior in Ghana some bank level and macroeconomic factors are studied by using GMM system of estimator. It found that bank size have appositive and statistically significance influence on bank lending. In addition to this, this study found that higher level of bank capital is found to support much higher volume of bank lending, these two results are in line with Chernykh and Theodossiou (2011) i.e. higher and well capitalized banks are better able to with stand potential credit risks and therefore, allocate higher percentage

of their assets to business loans. Contradictly, the findings of Liadroo (2012) showed the bank size has a negative association with lending in CEE countries which is opposite to expected by the author. The possible explanation given by the author is smaller banks greater lending growth was due to very low base whereas bigger banks' loan portfolio was already quit big and the lending growth measure did not exhibit so high growth rates in CEE region.

Ladime et al. (2013) found that log of foreign exchange rate and banks' lending rate have a negative coefficient and significant at all level of confidence. The possible reason why log foreign exchange rate is negative is that, it is an indication of depreciation of domestic currency against foreign currency and it tends to reduce the volume of loans made by banks. Because banks lean towards to invest in foreign currency if they expect the domestic currency depreciate hence reducing the amount available for loans and advance. Another macroeconomic variable GDP have negative relation and insignificance in Ghanaian banks in the study period. The author suggests that bank lenders expectations do not depend on current phase of business activities.

Bank lending behavior is highly influenced by monetary policy. Laidroo (2012) founds out the negative relation of lending rate with lending performance of banks. According to him if monetary policy is tightening it leads to increase interest rate and decreasing a growth of loan. In contrast Olokoyo (2011) and Malede (2014) find interest rate has a positive relation with lending.

Bank capital is considered as a predominant supply factor since it reflects the capability of a banks' loss when it happens withstanding of operational and abnormal losses happens (Liadroo, 2012). GDP growth had a positive relation with lending growth. The relationship is strong when the economy was above trend (2004-2008) in the study period with compared to when it was below trend (2009-2010). As an author (Liadroo, 2012) view this indicates that when the economy is above trend lending growth may have been driven by supply side factors. However, the theory states that the lending growth should be driven by demand side factors captured by the GDP growth.

The purpose of the study made by Olusanya et al. (2012) was to investigate the level of commercial banks loan advances in Nigeria and also to examine those various determinants of commercial banks' lending behavior in Nigerian which is co-integration analysis from 1975-2010. The study classified these determinants as internal and external factors. The study was conducted by using secondary data and series of econometrics adopted to justify a long run relationship of commercial banks and its lending behaviors. The result indicated that there is a positive relation between loans and advances and volume of deposit, annual exchange rate of Niara to dollars, GDP at current market price and cash reserve requirement. The result also showed that lending rate and investment portfolio have a negative relationship with commercial banks loans and advances. According to this study, it was also revealed from the result that there is a long run relationship between Loan and advances and all the explanatory variables in the model and this shows that commercial bank has a lot of impact of their lending behavior. Finally the study recommend and conclude that commercial bank should endeavor to create more deposit in other to improve their lending behavior and should enforce the most easily realizable policies and good credit management in every situation.

Obamuyi (2013) examined the extent of intermediation functions of deposit mobilization and grating of loans and advances of Nigeria banks and the effects on their performance. Secondary data obtained from annual reports and accounts from 2006-2011 was used. Purposive sampling was employed to select seven sample banks and descriptive statistics used in the study. The results of the study confirmed that banks with high deposits and loans perform better in terms of profitability than banks with low deposits and loans. Thus, Obamuyi (2013) suggested that the policy of the government must make savings attractive in order to positively influence the liquidity position of the banks and hence their lending behavior.

Another study by Richard and Okoye (2014) appraised the determinants of lending behavior of deposit money banks in Nigeria and examined four independent variables namely- liquidity ratio, lending rate, volume of deposit and cash reserve ratio. Quantitative

research design was used to carry out the study and Ordinary Least Squire (OLS) method of estimation was employed to test the short run equilibrium dynamic of the variables. The result indicated that level of lending rate, liquidity ratio and cash reserve ratio over the period have significant and positive impact on volume of loans and advances, whereas volume of deposit in Nigeria appears to have insignificant and negative impact on volume of loans and advances in Nigeria. Despite of the study of Richard & Okoyo (2014) and John (2014) study by adopting correlational research on 22 deposit money banks operating in Nigeria showed that there is a significant and positive relationship between volume of deposit and bank lending in Nigeria. The result revealed when banks attract more deposits more funds will offered to customers in the form of lending.

Araga (2014) investigated major exogenous factors on volume of lending by deposit money banks in Nigeria for the period 1990-2011. The study adopted multiple regression analysis to test the relationship between volume of loan and advance and independent factors. The test was made by E-Views 7 package. The result of the test shows that volume of deposits has a negative or inverse and insignificant relationship with loan and advances. On the other hand, lending rate, liquidity ratio and cash reserve ratio have a positive and statistically significant relationship with loan and advances of banks. The trace test revealed that there is a co-integration relationship among volume of loan and advance and liquidity ratio, lending rate and volume of deposit but not with cash reserve ratio.

2.5. Review of Previous Studies on Ethiopia

The study made by Assefa (2014) investigated the short and long-run impact of bank-specific, monetary policy and macroeconomic variables on bank credit to private sector in Ethiopia, using supply-side approach is empirically examined over the period 1978/79-2010/11. The methodology was based on the ARDL econometric approach using annual time-series data was employed. The study includes bank credit to the private sector as dependent variable while domestic deposit, foreign liabilities, lending interest rate, reserve requirement, broad money as percentage of NGDP, RGDP and inflation are major explanatory variables. The finding indicates that domestic deposits, foreign liabilities, real lending interest rate, M2 as percentage of NGDP, GDP and inflation have

significant impact on banks credit to the private sector in the long-run. Whereas reserve requirement does not affect commercial banks credit to private sector both in long and short-run. Moreover, in the short-run domestic deposit and economic growth do not influence commercial banks credit to private sector.

The other literature related to the objective of the paper made in Ethiopia is Malede (2014) Determinants of commercial banks' lending behavior for seven years from 2005-2011. The main aim of this study was to confirm determinants lending behaviors of commercial banks in Ethiopian case by using a panel data of eight banks. The study adopts Ordinary List Squires (OLS) method of estimation and examines some internal and external factors. The study found that bank size, credit risk, GDP and liquidity ratio have a positive and statistically significant relationship with Ethiopian commercial banks' lending. On the other hand cash reserve ratio, commercial banks' lending rate and investment portfolio have positive but statistically insignificant relation with bank lending in Ethiopian banks. There is a positive and statistically insignificant relation between volume of deposit and lending behavior of banks in the study period. As of the suggestion of the author it might be due to most deposits are current or demand which is repayable to depositors on demand. In conclusion, all variables included in the model have a positive impact on lending behavior of Ethiopian commercial banks in this study period.

2.6. Conclusions of Reviewed Literatures and Knowledge Gap

As we have seen above in empirical part of the literature, most scholars investigate the determinants of commercial banks' lending in different classifications. Some scholars suggest that the lending behavior of banks is affected by bank specific factors, industry specific factors and macroeconomic factors. On the other hand other researchers classify these determinants into internal and external factors. Variables like bank capital, credit risk, liquidity ratio, volume of deposits and the likes are considered as internal factors. Industry specific variables (monetary policy instruments) also include cash reserve requirement ratio and average lending rate of banks are studied in most literatures and some variables like GDP, foreign exchange rate and inflation are included in macroeconomic determinants.

However, several studies found different results on the impact of these variables in a number of countries of different study period. For example, volume of deposits has the highest and significant impact on lending behavior of Nigerian banks (Olokoyo, 2011; Richard & Okoyo, 2014; and John, 2014). On the same country Okoye (2014) found volume of deposit in Nigeria appears to have insignificant and negative impact on volume of loans and advances. Likewise, when we see Ethiopian studies Assefa (2014) found a significant influence of volume of deposits on Ethiopian banks' lending to private sector however Malede (2014) founds a positive and statistically insignificant impact of volume of deposits on lending behavior of Ethiopian banks. On the same manner other some variables shows a contradict result and therefore in order to fill this gap on Ethiopian case, the paper incorporate bank capital and annual exchange rate of birr to USD and tried to investigate the impact of some internal and external factors on Ethiopian commercial banks' lending behavior during the period 2004 to 2013.

2.7. Conceptual framework

Figure 2.1 below illustrates the relation between commercial banks' loans and advances and the explanatory variables. Loans and advances of commercial banks is a function of internal and external factors. Internal factors which included as bank specific determinants are liquidity ratio, credit risk, volume of deposit and bank capital. These factors are originated from each bank and its impact is for its own. On the other hand the other two box arrows illustrate external factors of loans and advances in which they are grouped as industry specific determinants (monetary policy instruments) and macroeconomic factors. Thereby, all of the three box arrows demonstrate the relation between the dependent variable of the study and its explanatory variables in different category. This conceptual framework illustrates the lending behavior of commercial banks which is measured by net loans and advance of banks is a function of both internal and external factors.

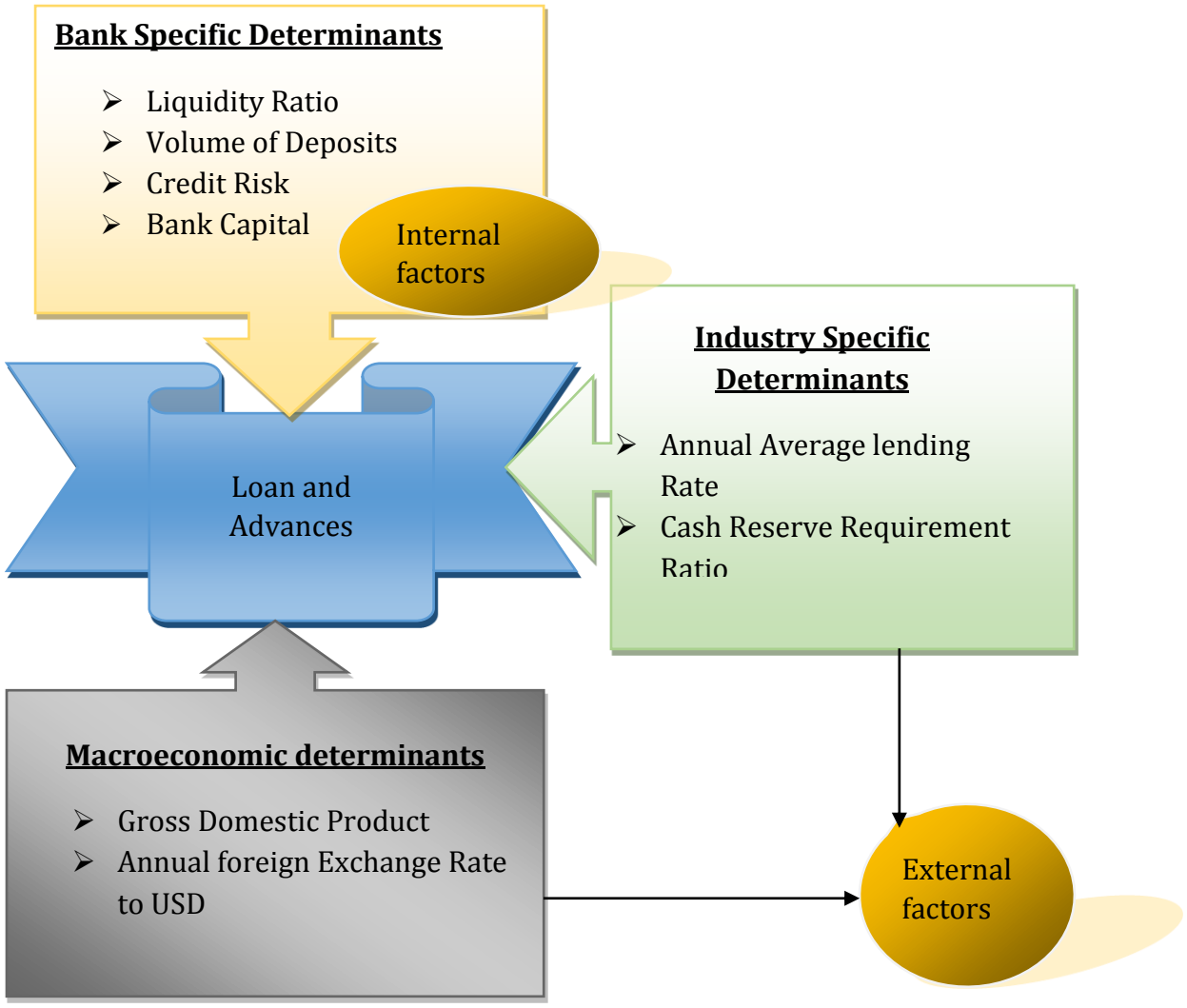

Figure 3.1: Conceptual frameworks of the dependent variable and explanatory variables.

Source: - Own extraction

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Introduction

According to Creswell (2003) research methodology is plan of action which links methods to outcomes, governs our choice and use of methods. This section of the paper clearly illustrates the research design, the types of sampling technique adopted, and types of data observed and collected in the paper. Furthermore, target population was discussed; the data measurement tools and method of data analysis employed including description of variables were presented.

3.2. Research Design

To attain the objectives of the study and to test the formulated hypothesis the study was employed quantitative research design since the study aims to examine the impact of independent variables on the commercial banks loan supply. This is believed appropriate because the study was involved in studying the effect of internal and external factors on banks' lending behavior. Annual financial report of 8 commercial banks, covering the period from 2004 to 2013 and other macroeconomic data were used for the study. The data are balanced panel and the reason of using it is panel data have an advantage of giving more informative data since it comprises both cross sectional, which captures individual variability, and time series information (Abebe, 2014). According to Brooks (2014) a panel of data will embody information across both time and space. Importantly, a panel keeps the same individuals or objects (entities) and measures some quantity about them over time. Ordinary Least Square (OLS) of method of estimation of a multiple regression model was chosen to undertake the study.

3.3. Population and sample Selection

The target population for this study was all commercial banks carry out their operation in Ethiopia which are 18 in number. Out of the total, two commercial banks; namely Commercial Bank of Ethiopia and Construction and Business Bank are state owned and the

remaining are privately owned. The sample consist eight (8) commercial banks that were registered before 2004 from 18 commercial banks operating in the country. The period 2004-2013 was chosen just to examine the determinants of bank lending using recent data for about one decade. There are banks established after 2004 but to avoid new entrant bias very recently established banks were not considered by this study. Out of 18 commercial banks the researcher was took all banks established and operated in the study period to undertake this investigation. Thus, banks established and started their operation after the starting time frame of the study i.e. 2004 was not included on the study.

Table 3:1 List of sample Ethiopian commercial banks included in the study.

No.	Private Commercial Bank	Year of establishment
1	Commercial Bank of Ethiopia	1963
2.	Construction and Business Bank[1]	1994
3.	Awash International Bank	1994
4.	Dashen Bank	1995
5.	Abyssinia Bank	1996
6.	Wegagen Bank	1997
7.	United Bank	1998
8.	Nib International Bank	1999

Source: www.nbe.gov.et

3.4. Type and source of data

The study used fully secondary data which are all collected from national bank of Ethiopia. It includes audited annual financial report of all sampled commercial banks, real gross domestic product growth rate and annual average exchange rate of birr to USD.

[1] Former it was Housing and Savings Bank created in 1975 and late became the Construction and Business Bank in 1994 (Charles, 1996).

3.5. Methods of Data Analysis

The study was used secondary data of audited annual financial report of banks, real GDP growth rate and annual exchange rate of Ethiopian Birr to US Dollar of ten consecutive years which are all collected from National Bank of Ethiopia. Inferential statistics were used to draw conclusions about the reliability and generality of the findings. After the data are edited in the appropriate form the study was run by using STATA package13 software to be able to interpret and analyze. The data was panel from 2004-2013 which contains both a cross sectional and time series. Different diagnostic tests like model adequacy, hetroscedasticity, multicollinearity, normality, autocorrelation and cross sectional independency were carried out for the purpose of the adopted model and the employed explanatory variables to be satisfactory and free from any statistical error.

3.5.1. Model Specification

To test the hypotheses of the study multiple regression model was formulated. The model was modified from Olokoyo (2011); Olusanya et al. (2012); and Malede (2014). As it is explained previously, the dependent variable of the study is loans and advances of banks and the explanatory variables i.e. credit risk, liquidity ratio, cash reserve ratio, gross domestic product, average lending rate, average annual exchange rate of Birr to US Dollar, volume of deposits and bank capital. The study used Ordinary Least Square (OLS) method of estimation to estimate the parameters or regression coefficients.

LOA=f(Cr, Lr, Crr, Gdp, Alr, Fx, Vd, Bc, Є)……(1)

To represent some omitted variables, measurement error and sampling error of the empirical model the study included disturbance (error) term **Є** which represent other variables which were not explained by the independent variables included in the model.

The multiple regression equation of the above model (1) is extended as follows:

$$\boldsymbol{LOA}it = \boldsymbol{\alpha} + \boldsymbol{\beta}1\boldsymbol{Cr}it + \boldsymbol{\beta}2\boldsymbol{Lr}it + \boldsymbol{\beta}3\boldsymbol{Crr}it + \boldsymbol{\beta}4\boldsymbol{Gdp}it + \boldsymbol{\beta}5\boldsymbol{Alr}it + \boldsymbol{\beta}6\boldsymbol{Fx}it + \boldsymbol{\beta}7\boldsymbol{Vd}it + \boldsymbol{\beta}8\boldsymbol{Bc}it + \boldsymbol{\varepsilon}it$$

…… (2)

Where:

LOA_{it}: Loans and Advances of Bank i at time t

Cr_{it}: Credit Risk of Bank i at time t

Lr_{it}: Liquidity Ratio of Bank i at time t

Crr_{it}: Cash Reserve Ratio of bank i at time t

Gdp_{it}: Gross Domestic Product of Bank i at time t

ALr_{it}: Average lending Rate of Bank i at time t

Fx_{it}: Annual Foreign Exchange rate of Birr to USD of Bank i at time t

Vd_{it}: Volume of Deposits of Bank i at time t

Bc_{it}: Bank Capital of bank i at time t

Є: error term of the model

α: Intercept of the regression line

β (1-8) parameters or coefficients to be estimated

3.6. Description and Measurement of Variables

Dependent Variable

Loans and advances is the main source of single income asset (Nwankwo, as cited in Olokoyo, 2011) and primary functions of commercial or deposit banks. On the other hand, loan is crucial for investment and long term economic growth of a given country. Despite its importance to the bank and to the economy, the credit decision is influenced by different bank specific and macro-economic factors. So many researches were conducted to identify the determinants and their effect on loans and advances of banks by several scholars. The degree of influence is different from country to country. The study was took net loans and advances of banks as a dependent variable to conduct the study (Olokoyo, 2011; Olusanya et al., 2012; and Malede, 2014).

Independent Variables

Based on literatures and by considering the prevailing banking system in Ethiopian, eight explanatory variables are selected for the purpose of examining lending behavior of commercial banks.

Credit Risk

Credit risk is the potential of a particular borrower or a counterparty default or failure to meet its obligation in accordance with contracts. Loans and advances are the main source of credit risk for commercial banks (Kaaya & Pastroy, 2013). Credit risk is not the only but the major important factor which affects the bank lending behavior among various risks (credit risk, liquidity risk, market risk, foreign exchange risk, etc.) Credit risk is measured by evaluating the probability of default by a particular borrower after taking into account various risk diversification and hedging arrangements (He & Wang, 2012). Banks should critically approve the risk premium charged from the borrower before granting the loan. Commonly the loan granting is dependent on the size of the premium which can be calculated by considering different factors. For the purpose of this study credit risk was commonly measured by using provision for loan loss (Non-performing loan) to the gross loan amount (Tehulu & Olana, 2014; and Bologna, 2011). It was expected a negative relation with loan and advance of banks.

Liquidity Ratio

Commercial banks are required by central (national) banks to be always liquid to meet the demands of depositors. Thus, maintaining a certain level of liquid asset is essential for each bank before entering to lending activity. Liquidity ratios are explained by various balance sheet ratios used to identify the liquidity trend of that particular bank. These ratios can be used to measure the liquidity risk of the bank. The ratio of liquid asset to total deposits would be used for this study as a measure of liquidity ratio. A positive relation would be expected depending on the state of the policy (Olokoyo, 2011; Olusanya et al., 2012; and Malede, 2014).

Cash Required Reserve

Cash reserve requirement is a monetary policy tool for central banks of nations that is used to balance the circulated currency and to correct various issues of the economy. Every bank is required by the central bank of the country to maintain certain percentage of its deposit liabilities held in the form of demand (current) deposits, saving deposits and time deposits. These parts of deposits are prohibited to provide private credit or to buy securities (Glocker & Towbin, 2011.). This amount or ratio of required reserve set by the central (federal) bank of a country have an impact on the volume of deposit which then used for lending. If the reserve requirement ratio increases, the amount of deposit held by banks for granting loan decreases, and vice versa. Statutory reserve requirement to total asset of the specific bank is used for the purpose of this study. It would be expected that it have positive relation with the dependent variable (Olokoyo, 2011; Malede, 2014).

Gross Domestic Product (GDP)

As many literatures state, macroeconomic situations have an effect on lending activity of commercial banks. GDP growth is one element of macroeconomic factors which is used to measure the economic growth of a country and used to control changes in a loan demand (Djiogap & Ngomsi, 2012). In the determination of GDP growth from one year to another, real GDP give a more accurate view of the economy (Murumba, 2013) since real GDP is the sum of the value added in the economy during a given period or the sum of incomes in the economy during a given period adjusted for the effect of increasing prices (Daferighe & Aje, 2009). Therefore, the study uses real GDP as a determinant rather than using the nominal GDP because nominal GDP has the following limitations. The one is the production of most goods increases overtime and the second is that the birr price of most goods increases overtime. When a country is in boom, the real GDP growth raises, the investors can run their business through debt and this encourage credit service of banks. At the same time the debt repayment ability of borrowers increases and the opposite is true when economy is depressed (GDP growth is very low or go down). Real GDP growth rate is used for the purpose of this study. GDP growth would be expected to have positive relationship with bank lending (Olokoyo, 2011; Djiogap & Ngomsi, 2012; and Malede, 2014).

Interest (Lending) Rate

It is a rate set by the lender or the bank to charge the borrowing unit. This rate mostly include the cost of raising funds through deposit, owner contribution (equity) and/or from financial markets, risk premium to compensate the additional risk, operating cost and profit margin. The amount or level of lending rate will have its own effect on lending growth of banks. It is measured by taking average annual lending rate of banks (Bologna, 2011; and Malede, 2014). Ceteris paribus, the rising of lending rate will diminish the demand of loan and vice versa. Thus, it was expected that it have a negative relation with loans and advances.

Volume of Deposit

Amount of deposit attracted by banks in the form of saving, current or demand and time deposits have influence on the loans and advances. Deposits are the main source of funding for banks and are the lowest cost source of liability for granting loans and advances (Alper & Anbar, 2011). Richard and Okoye (2014) on their study of determinants of lending behavior of deposit money banks in Nigerian found that lending behavior of Nigerian banks are determined by level of deposit available and other factors. In the same manner, Araga (2014) observe that change in volume of deposit, with other explanatory variables have great changes in volume of banks' loans and advance in the economy. Total deposit liability of the bank was used for the study. Generally, it was expected that there is a positive relation between volume of deposit and loans and advances of the banks.

Bank Capital

Chernykh and Theodossiou (2011) states that well capitalized and larger banks are better able to withstand potential credit risks and, therefore, allocate higher percentage of their assets to business loans. This implies that the amount of capital have its own influence on the lending function of banks. The finding of Gambarcota and Mistrulli (2003) shows that well capitalized banks can be able to better absorb temporarily financial difficulties on the part of their borrower and preserve long term lending relationships. Their study also reflects that excess capital is a direct measure of banks capacity to expand credit because it takes into consideration prudential regulation constraints. In this paper total of shared capital was used and a positive relation with loan growth was expected (Laidroo, 2012)

because excess capital contributed by the owners can affect the bank willingness and ability of to extend credit.

Operationalization of the Study Variables

This part shows the measurement of the variables that are employed in the study. Furthermore, the expected sign of each explanatory variable are presented by taking to account their influence on dependent variable.

Table 3:2: Definition of variables, measurement and the expected sign

Symbol	Variables	Measurement	Expected Relation
	Dependent variable		
LOA	Loan and advances	Non-performing loan/Total loans and advances	
	Independent variable		
CR	Credit risk	Non-performing Loan/Total Loans and Advances	–
LR	Liquidity Ratio	Liquid assets/Total Deposit	+
CRR	Cash Reserve Ratio	Statutory reserve requirement/Total asset	+
GDP	Gross domestic product	Real GDP growth rate	+
ALR	Average Lending Rate	Annual average bank lending rate	–
FX	Foreign Exchange Rate	Annual exchange rate of Birr to US Dollar	–
VD	Volume of Deposits	A sum of all types of deposits	+
BC	Bank Capital	A Total Share capital	+

CHAPTER FOUR

4. DATA ANALYSIS AND DISCUSSION

The study examined the determinants of commercial banks' lending behaviors of 8 public and private commercial banks that are operated in Ethiopia. The data was collected from all commercial banks that have full year data and analyzed for about one decade (i.e. 2004-2013). This section of the paper deals with the analysis and presentation of the results of the study. The data were analyzed by using STATA software of package 13. To fulfill different assumptions of classical linear regression model different diagnostic test were engaged. The factual data were analyzed and presented by using tables and graphs. Besides, econometric analysis of the main finding of the study were presented.

4.1. CLRM assumptions and Diagnostic tests

4.1.1. Goodness of fit

In examining the determinants of banks' lending behavior of commercial banks the study included eight explanatory variables (i.e. credit risk, liquidity ratio, cash reserve ratio, GDP, annual average lending rate, annual foreign exchange rate of birr to USD, volume of deposits and banks' capital). These explanatory variables have functional relationship with the regressed variable. Even if the dependent variable is a function of the above explanatory variables, it is better to test how the model is fitted or how these variables explain the dependent variable. Thus, goodness of fit statistics is one tool of knowing whether the explained variable is adequately explained by the included explanatory variables.

The goodness of fit of the model can be measured by the square of the correlation coefficient also called R^2 which is the most popular goodness of fit statistics (Brooks, 2014). According to Brooks R^2 is the square of a correlation coefficient; it must lie between 0 and 1 and if this correlation is high, the model fits the data well, while if the correlation is low (close to zero), the model is not providing a good fit to the data. It can be shown that $0 \leq R^2 \leq 1$. Only if all $\epsilon_i = 0$ it holds that $R^2 = 1$, while the R^2 is zero if the model does not explain

anything in addition to the sample mean of Y_i. In addition, adjusted R^2 which is the modification for the limitation of R^2 is considered to measure the fitness of the model better than R^2. As shown from Table 4.6, R-squared and Adjusted R-squared are 0.9233 and 0.9126 respectively. As we have seen before, R-square shows the amount of variance of the dependent variable is explained by the explanatory variables included in the model. Thus, the R^2 value shows that the independent variables in the model are explaining 92.33% of the variations on the dependent variables. Besides, adjusted R^2 (i.e. the modification for the limitation of R^2 adjusted by the number of cases and the number of variables) is shows an amount of 91.26%. This provides an honest association between independent and dependent variables since adjusted R^2 is closer to R^2 due to the number of variables are small and the number of cases is very large.

Similarly, the goodness of fit of the model can be measured by F-statistics. F-statistic, the regression mean square divided by the residual mean square, is used to test goodness of fit of the model.

The hypothesis to be tested in goodness of fit statistic is;

H0: There is no relationship between explained and explanatory variables.

H1: There is a relationship between explained and explanatory variables.

Therefore, by comparing the significance value of F-statistic from the table 4.6 with the P-value at 5% significance level, we may reject or fail to reject the null hypothesis of the fitness of the model. The value of F- statistic of regression model in general, from the table shows 0.000 which is significant at 5%. Thus, the statistical value of the regression model that is used for the study is less than 0.05. (i.e. $P < 0.000$), and therefore we reject the null hypothesis of "there is no relationship between explained and explanatory variables" showing that there is a linear relationship between loans and advances and the eight independent variables. Therefore, the model used for the study is significantly good enough in explaining the variation on the dependent variable.

Thus, from R^2 and F-statistics we can understand that the model of the study is providing a good fit to the data.

4.1.2. Normality Test

One assumption of classical linear regression model (CLRM) is the normal distribution of the residual part of the model. As noted by Gujarati (2004), dependent variable is being a linear function of residuals, is itself normally distributed with the mean and variance. OLS estimators are BLUE regardless of whether the residuals are normally distributed or not (Brooks, 2014). If the disturbances ($Є_i$) are independently and identically distributed with zero mean and constant variance and if the explanatory variables are constant in repeated samples, the OLS coefficient estimators are asymptotically normally distributed with means equal to the corresponding β's.

If the residuals are normally distributed around its mean of zero the histogram shows a bell-shaped. The shape of the histogram shown in Appendix 3 is bell and this indicates that the residual is normally distributed around its mean of zero.

4.1.3. Hetroscedasticity Test

Homoscedasticity is another CLRM assumption which states those disturbances appearing in the population regression are homoscedastic i.e. the variance of the error term is constant across all observations. But there are many situations in which this assumption may not hold (for example the variance of the error term may increase or decrease with the dependent variable or one of the independent variables) and this called hetroscedasticity problem. Heteroscedasticity arises if different error terms do not have identical variances, so that the diagonal elements of the covariance matrix are not identical. It happens when error term is normal distributed with mean 0, but the variance is no longer constant; the variance of the error term differs across observations. For example, it is possible that different groups in the sample have different variances. It means that the error terms are mutually uncorrelated, while the variance of ε_i may vary over the observations (Verbeek, 2004).

There are consequences of hetroscedasticity if the assumption is violated. The problem leads estimates to be no longer BLUE. That is, among all the unbiased estimators, does not provide the estimate with the smallest variance. Depending on the nature of the hetroscedasticity, significance tests can be too high or too low. The reason OLS is not

optimal when hetroscedasticity is present is that it gives equal weight to all observations when, in fact, observations with larger disturbance variance contain less information than observations with smaller disturbance variance. In addition, the standard errors are biased when hetroscedasticity is present. This in turn leads to bias in test statistics and confidence intervals. Fortunately, unless hetroscedasticity is marked, significance tests are virtually unaffected, and thus OLS estimation can be used without concern of serious distortion. But, severe hetroscedasticity can sometimes be a problem.

Modified Wald test for group wise hetroscedasticity in fixed effect regression model was used to test the presence of hetroscedasticity problem of the study.

The possible hypothesis of the test was as follows:

Ho: Variances of the error terms are constant (Homoscedasticity)

H1: Variances of the error terms are not constant (hetroscedasticity problem)

Table 4:1: The Modified Wald test for group wise heteroscedasticity in fixed effect regression model.

H0: sigma(i)^2	**= sigma^2 for all i**	
chi2 (8)	=	703.40
Prob>chi2	=	0.0000

Source: Own computation

According to Modified Wald test, the presence of hetroscedasticity problem is shown since P-value is less than 5%. If P-value is significant it leads to reject the null hypothesis and accept the alternate hypothesis i.e. "there is no constant variance." Accordingly, above table 4.1 shows that P-value is less than 5% (i.e. 0.0000) which is significant, and then we have going to reject the null hypothesis and accept the alternate. This revealed that there is a presence of hetroscedasticity problem on the model. Nevertheless, to control for hetroscedasticity problem the data was robusted and clustered robust standard error regression result were used.

4.1.4. Test of Multicollinearity

This is also one of the classical linear regression model (CLRM) states that there is no multicollinearity or relationship among the regressors included in the regression model. As noted by Gujirati (2004), multicollinearity means that it the existence of a "perfect," or exact, linear relationship among some or all explanatory variables of a regression model. According to him, multicollinearity refers to the existence of more than one exact linear relationship. Besides, Gujirati claimed if multicollinearity is perfect, the regression coefficients of the explanatory variables are indeterminate and their standard errors are infinite; while if multicollinearity is less than perfect, the regression coefficients, although determinate, possess large standard errors (in relation to the coefficients themselves), which means the coefficients cannot be estimated with great precision or accuracy.

Multicollinearity problem reduces the individual explanatory variables' predictive power because highly correlated explanatory variables share the same information each other (Abebe, 2014) and it make hard to get coefficient estimates with small standard error (Gujirati, 2004). Gujirati also argued, even if multicollinearity is very high (near multicollinearity) and but all other assumptions does not violated, the OLS estimators still retain the property of BLUE.

Table 4:2: Pearson correlation matrix of variables.

	Loa	Cr	Lr	Crr	Gdp	air	Fx	vd	Bc
Loa	1.0000								
Cr	-0.1289	1.0000							
Lr	-0.3587	0.4913	1.0000						
Crr	-0.1192	-0.2567	-0.0160	1.0000					
Gdp	-0.2695	0.2888	0.0371	-0.6050	1.0000				
Air	0.1819	-0.2460	0.1580	0.5397	-0.6951	1.0000			
Fx	0.3337	-0.3485	-0.1496	0.6325	-0.6800	0.5745	1.0000		
Vd	0.4189	-0.0427	-0.2934	-0.1567	-0.2253	0.1535	0.3018	1.0000	
bc	0.3219	-0.0193	-0.1978	-0.1243	-0.2459	0.1986	0.2561	0.5248	1.0000

Source: Own computation

The above table is a correlation matrix for all variables in the model. Numbers of a Pearson correlation coefficients are go from -1 to 1. Closer to 1 means strong correlation. A negative value indicates an inverse relationship (roughly, when one goes up the other goes down). Li Yuqi (as cited in Abebe, 2014) stated that problem of multicollinearity exists when correlation coefficient among the explanatory variables are greater than 0.75. Since all correlations among the explanatory variables were weak i.e. less than 0.75 and this revealed that there is no multicollinearity problem in this study.

Variance inflating factor (VIF) is another method used to test the presence of multicollinearity problem in this study. The speed of variances and covariance increase can be seen by the VIF, which shows how the variance of an estimator is inflated by the presence of multicollinearity problem (Gujirati, 2004). That is, as the extent of collinearity increases, the variance of an estimator increases, and in the limit it can become infinite. As a rule of thumb, if VIF exceeds than 10, the variable is said to be highly collinear. Accordingly, as shown from appendixes 1 there is no multiclollinearity problem since the VIF of each variable is under 4 (four) and the mean VIF is 3.35 which is much lower than 10.

The overall test shows that there is no multicollinearity problem on this model. Thus, all explanatory variables included in the model are basic determinants of lending behaviors of commercial banks in Ethiopian. Since multicollinearity violates none of our assumptions, the "problem" of multicollinearity is not really the problem of this study (Wooldridge, 2000).

4.1.5. Test of Autocorrelation

The researcher conduct a test of the assumption of zero covariance of error terms overtime and space. Serial correlation is happen when error terms from different (usually adjacent) time periods (or cross-section observations) are correlated.

According to Pindyck and Rubinfeld (1991), serial correlation does not affect the unbiasedness or consistency of OLS estimators, but it does affect their efficiency. With positive serial correlation, the OLS estimates of the standard errors will be smaller than the true standard errors. This will lead to the conclusion that the parameter estimates are

more precise than they really are. There will be a tendency to reject the null hypothesis when it should not be rejected. As noted by Verbeek (2004), in the presence of autocorrelation OLS remains unbiased, but it becomes inefficient and its standard errors are estimated in the wrong way.

For that reason, Wooldridge test for serial correlation was conducted to test the presence of autocorrelation. The postulates of this test are:

Ho: There is no first order autocorrelation.

H1: There is first order autocorrelation.

Table 4:3. Wooldridge test for autocorrelation in panel data

F(1, 7)	**=**	**2.424**
Prob > F	=	0.1634

Source: Own computation

As shown from table 4.3, the P- value of the test is 16.34% which is insignificant (at 95% confidence interval). Thus, we have to fail to reject the null hypothesis of "residuals are not correlated." The Wooldridge test for autocorrelation shows that there is no first order autocorrelation between error terms in this model.

4.1.6. Testing for Cross-Sectional Dependence/Contemporaneous Correlation.

Pesaran CD (cross-sectional dependence) test was used to test whether the residuals are correlated across entities. Cross-sectional dependence can lead to bias in tests results (also called contemporaneous correlation). The hypothesis is:

Ho: The residuals are not correlated (there is no cross sectional dependency).

H1: The residuals are correlated (there is cross sectional dependency).

Table 4:4 Pesaran's test of cross sectional independence

```
xtcsd, pesaran abs

Pesaran's test of
cross sectional
independence
                        =      1.478,          Pr = 0.1393
Average absolute
value of the off-
diagonal elements
                        =      0.348
```

Source: own computation

Table 4.4 above show that the p-value is 13.93% which is more than 5% and this revealed that residuals are not correlated across entities. Therefore, we are going to accept the null hypothesis that states "residuals are not correlated across entities."

Generally, the model fulfilled the above all CLRM assumptions and we can conclude that OLS estimators are BLUE.

4.2. Model Selection: Fixed Effect vs Random Effect Models

The model used to examine the determinants of lending behavior of commercial banks in Ethiopia is panel data model. As noted in Brooks (2014), panel data is developed using three approaches that can be employed in financial research: pooled OLS regression model, fixed effects models and random effects models.

The fixed effect regression model used when a researcher wants to control omitted variables that differ between cases but are constant over time. It allows for heterogeneity or individuality among companies by allowing having its own intercept value. It is due to the fact that although the intercept may differ across commercial banks, but intercept does not vary over time, that it is time invariant. It allows using the changes in the variables over time to estimate the effects of the independent variables on dependent variables (Li Yuqi, as cited in Abebe, 2014). Similarly, Li Yuqi thought regression with between effects is the models to use when want to control for omitted variables that change over time but are constant between cases. It allows using the variation between cases to

estimate the effect of the omitted independent variables on dependent variable. In contrast, according to Li Yuqi if we have reasons to believe that some omitted variables may be constant over time but vary between cases and others may be fixed between cases but overtime, then we can include both types by using random effects.

The best way of choosing between the fixed effect model and the random effect models is running the hausman specification test. The hausman specification test checks a more efficient model against a less efficient but consistent model to make sure that the more efficient model also gives consistent results. If the p-value for the hausman test is less than 5%, this shows that the random effects model is not appropriate and that the fixed effects mode is to be preferred. Accordingly, to choose the appropriate model the study runs hausman specification test below.

The null and alternative hypotheses for hausman specification test are as follows:

Ho: Random effect is appropriate

H1: Fixed effect is appropriate

Table 4:5 Hausman specification test for fixed random, sigmamore

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)	=	20.93
Prob>chi2	=	0.0221

Source: Own computation

As shown from table 4.4 the P-value is significant because it is lower than 5% and this leads to fail to accept the null hypothesis and we are going to accept alternate hypothesis of fixed effect is appropriate. This shows that when the estimates for the random effect estimator are significantly differ from the estimates for the fixed-effect estimator, the null is rejected and conclude that error term is correlated with X_i, and therefore the fixed-effect model is the appropriate model for the study. According to Gezu (2014), if

the number of year is exceeds number of cross section, fixed effect model is appropriate which is true for this study.

4.3. Analysis of Regression Result

This section presents the regression results of fixed effect model that made to examine the determinants of loans and advances of commercial banks in Ethiopia. The regression results are made by the help of STATA version 13.

The study used panel data from 2004- 2013 and this data can be done either by pooled OLS, random effect or fixed effect model. To select the appropriate model, the character of individual effects was tested through the hausman specification test. Based on comparison result between random and fixed effect model through hausman specification test, an appropriate model for this study was fixed effect model. Thus, the cause and effect relationship between loan and advance and explanatory variables was examined by fixed effect model.

Hence, the model used to examine this study is shown as follows:

$$\boldsymbol{LOA}it = \boldsymbol{\alpha} + \boldsymbol{\beta}1\boldsymbol{Cr}it + \boldsymbol{\beta}2\boldsymbol{Lr}it + \boldsymbol{\beta}3\boldsymbol{Crr}it + \boldsymbol{\beta}4\boldsymbol{Gdp}it + \boldsymbol{\beta}5\boldsymbol{Alr}it + \boldsymbol{\beta}6\boldsymbol{Fx}it + \boldsymbol{\beta}7\boldsymbol{Vd}it + \boldsymbol{\beta}8\boldsymbol{Bc}it + \boldsymbol{\varepsilon}_{\mathbf{it}}$$

Table 4.6 below presents the result of fixed effect regression model which standard errors were regressed by clustered robust type to examine the effect of explanatory variables on loan and advance of commercial banks. The main reason of using clustered robust standard error was to overcome hetroscedasticity problem that was happen in the model.

As stated earlier chapters the independent variables were credit risk, liquidity ratio, cash reserve ratio, GDP, average lending rate, annual foreign exchange rate of birr to USD, volume of deposit and bank capital, and loan and advance is the outcome variable.

Hence, the result of the following table demonstrates the coefficients, robusted standard error, t and p- values.

Table 4:6. Results of clustered robust fixed effect regression model

Loa	Coefficients	Robust std. error	t	p>|t|
Cr	-12.0552	3.46048	-3.48	0.010*
Lr	-2.939843	0.9073405	-3.24	0.014 **
Crr	29.62107	15.8851	1.86	0.104
Gdp	-.293416	0.238735	-1.23	0.259
Alr	.2418991	0.0404196	5.98	0.001*
Fx	-.1576853	0.0739747	-2.13	0.071***
Vd	.5307605	0.0034908	152.04	0.000*
Bc	-1.082124	0.2039808	-5.31	0.001*
Constant	4.155909	3.936581	1.06	0.326
No. of observations = 80 R^2 = 0.9233 Adju. R^2 = 0.9126 Rho = 0.45485473 Prob > F = 0.0000				

Note: **significant @ 1%, ** significant @5% and ***significant@10%*

Source: own computation

Thus, based on the above table the following model was developed to examine the determinants of commercial banks of loans and advances in this study.

$$\boldsymbol{LOA = 4.16 - 12.06Cr - 2.94Lr + 29.62Crr - 0.29Gdp + 0.24Alr - 0.16Fx + 0.53Vd - 1.08Bc + \varepsilon}$$

The above table 4.6 shows that the coefficient determination (R^2) is 0.9233 which revealed that 92.33% of the variation in LOA is explained by the included explanatory variables (credit risk, liquidity ratio, cash reserve ratio, gross domestic product, annual average lending rate, annual foreign exchange rate to US dollar, volume of deposits and bank

capital). Moreover, Rho presents 45.49% variation in LOA is due to entity (bank) specific characteristics of the selected cross sectional entities or banks. In addition to this, F-statistics of this model have a p-value of 0.0000 and this indicates that the included explanatory variables of the model affect the level of LOA.

Based on the above table 4.6, all endogenous determinants volume of deposits, bank capital, credit risk and liquidity ratio have a significant impact on loans and advances. On the other hand, all industry specific and macroeconomic determinants except annual exchange rate (significant @10%) and lending rate (significant @1%), they have not a significant effect on loans and advances. The p-value of credit risk, volume of deposit, bank capital and lending interest rate is 0.010, 0.001, 0.000 and 0.001 respectively; this revealed that these four variables are significant at 1% significance level while liquidity ratio is significant at 5% level of significance since the p-value is 0.014. The p-value of foreign exchange rate is 0.071 which is significant at 10% level of significance. The p-value of cash reserve requirement ratio and GDP are 0.104 & 0.259; this shows that they are insignificant at 1%, 5% and 10% significance levels and this revealed that they are not strongly explain the loans and advances of Ethiopian commercial banks.

When we come to coefficients of the independent variables; cash reserve ratio, average lending rate and volume of deposit have a coefficient of 29.62107, 0.2418991 and 0.5307605 respectively. This revealed that these variables have a positive relationship with loans and advances. Thus, the decrease of those variables will lead to decrease in loans and advances and also increase those variables will lead to an increase in loans and advances.
On the other hand, credit risk, liquidity ratio, gross domestic product, foreign exchange rate and bank capital has a negative relation since their respective coefficients have a negative sign i.e. -12.0552, -2.939843, -0.293416, -0.1576853 & -1.082124. This indicates that there was an inverse relationship between these independent variables and loans and advances.

4.4. DISCUSSION OF THE RESULTS

Based on previous studies and the finding of this study, this section discussed the general result obtained via Fixed Effect regression Model. Referring the literature, the result of each

explanatory variable including their impact on the level of loans and advances of commercial banks in Ethiopia was discussed. Thus, results of the finding that were displayed in Table 4.6 were discussed in relation to the previous empirical and theoretical literatures.

4.4.1. Bank Specific Determinants

Credit Risk

The credit risk ratio of banks which measured by non-performing loan to total loans has a beta of -12.055 with a p-value of 0.010. It is significant at 1% and it can be concluded that credit risk is a good explanatory variable. This indicated that credit risk is statistically significant which influencing the banks' loan supply. The beta value indicates that credit risk have an inverse relationship with loan and advance of Ethiopian commercial banks. The regression coefficient shows, every 1 unit increase in credit risk, on average, leads commercial banks' lending decrease by 12.055 units. This inverse relationship with credit risk and banks' lending revealed that NPL to total loans and advances ratio of banks increase leads them to decrease the volume of loans and advance which is provided to customers. Higher nonperforming loans to total loans affect negatively the total business lending capacity of Ethiopian commercial banks which means that when credit risk is high it tend to reduce banks' income and balance sheet which then reduce bank loans supply. Furthermore, the sign of credit risk ratio conform to our prior expectation and this shows that as the increment of NPL to total loans and advances ratio will decrease the level commercial bank loans and advances in the economy. It is found a consistent result with Tomak (2013) but it is not agreed with Malede (2014).

Liquidity Ratio

The hypothesis was developed to test the relation between bank lending and liquid assets to total deposit ratio of banks shows a beta coefficient of -2.940. This connotes that liquidity ratio have a negative/inverse relation with bank lending behavior of Ethiopian commercial banks over the period 2004-2013. The coefficient demonstrates that every 1 unit birr increase in liquidity ratio will cause loans and advances to change by 2.940 units in opposite direction. The p-value of 0.014 shows that it is statistically significant at 5%

level and it indicates that the level of liquidity ratio of a given bank has an impact on banks' lending behavior. The value of p-value indicates that liquidity ratio is good explanatory variable to influence banks' loan supply. Based on the p-value of the parameter the researcher fails to accept the null hypothesis. Thus, the alternative hypothesis which states "there is a significant relationship between banks' lending and liquidity ratio" is accepted. The negative relationship between loans and advance of Ethiopian commercial banks and their liquidity ratio (measured by ratio of liquid assets to total deposit volume) is maybe banks hold high amount of liquid assets, are easily converted to cash at low cost, since they are liable to meet depositors at any time. If this is the case, holding large amount above the optimum level may diminish the volume of credit allowed to customers. Also it maybe if they not issue immediate loan from surplus liquid assets. However this result is inconsistent with previous results of Olokoyo (2011); Olusanya et al. (2012); and Malede (2014) which found a significantly positive relationship.

Volume of Deposits

The coefficient of deposits amount of banks shows 0.531, and this revealed that there is a positive association between volume of deposits and commercial banks' lending in Ethiopia which reveals one unit increase in volume of deposit lead commercial banks loan and advance increase by 0.531 units. This coefficient shows that deposit plays the major role in affecting banking sector loans to customers in the study period. This relationship is significant at 1% significant level and this portray that the amount of loans and advances granted by Ethiopian commercial banks is highly influenced by the deposit amount collected from their customers in the form of demand, saving and time deposits. This depict that the volume of deposits banks able to attract greatly impact on the banks' lending performance and behavior positively. Based on the p-value (0.000), the null hypothesis that states volume of deposit has no a significant relationship with commercial bank loans and advances should be rejected and therefore the alternative hypothesis is accepted. The result of this study aligns with that of Olokoyo (2011), who examined the determinants of commercial banks' lending behavior in Nigeria during the pre- consolidated period. This connotes that the more deposit a bank is able to attract, the more fund would be available for lending to customers. This result is also consistent with John (2014) who

focused on the effect of deposit volume on lending behavior in the Nigerian post-consolidation banking era. The association with loan and advance is also supported by the finding of Djiogap and Ngomsi (2012) and Olusanya et al. (2012). This result also consistent with Assefa (2014) which found volume of domestic deposit influence the growth of bank credit to private sector positively and statistically significant at 10% level. However, it is inconsistent with the result of Malede (2014) which found volume of deposits is statistically insignificant that is the opposite of this result.

Moreover, the sign of volume of deposit conform to our aforementioned expectation and this shows that as a lot of customers will definitely increase their deposit in the bank, then commercial banks increase their Loan and advance in the economy. Generally, the implication for the result is that as commercial banks deposit increase their assets and liquidity also increase, as a result banks can increase the volume of credit granted to clients.

Bank capital

Regarding share capital of banks that determines the risk taking behavior of banks; this study identifies statistically significant negative impact of bank capital on loans and advances. The p-value of the bank capital is 0.001 which indicates it is statistically significant at 1% significance level. Therefore, the null hypothesis is rejected and the alternative hypothesis of the study variable, "there is a significant relation between loans and advances of commercial banks and bank capital" should be accepted. As a result, bank capital is a best determinant of Ethiopian commercial banks' lending behavior since it is statistically significant at 1% level of significance.

Moreover, the coefficient of this variable shows that there is inverse relationship between share capital of banks and their loans and advances. Thus it implies that a one unit change in the banks' capital, keeping other things constant had resulted -1.082 unit changes on the volume of loans and advances in opposite direction. However, this result is not consistent with other empirical results and the theory of "bank lending channel". The likely justification for inverse relation is Ethiopia commercial banks put excess capital which is more than they required to reserve statutorily. National bank of Ethiopia issues a Directive

No. SBB/24/99, commercial banks capital must be at least equal to 8 per cent of the total amount of risk-weighted assets (solvency ratio). However Ethiopian commercial banks put more than the required amount and this leads their loans and advances and capital to have an opposite relationship. However, the finding is not consistent with (Gambacorta and Mistrulli, 2003; Abdul Karim, Wan Ngah and Abdul Karim, 2010; Chernykh, & Theodossiou, 2011; and Karmakar & Mok, 2013).

Generally, from the above discussion internal factors that are called bank-specific factors have a significant impact on volume of loans and advances of Ethiopian commercial banks. All bank-specific factors are statistically significant at 1%, 5% level of significance and it can be concluded that all bank specific determinants included in the model are highly influence the loans and advances of Ethiopian commercial banks. Besides, Rho of the regression result of the table 4.6 is (Rho = 0.4548) also confirms the above statement; and this portrays that 45.48% the variation of Ethiopian commercial banks' lending is due to the impact of bank specific determinants. Therefore, it can be conclude that all internal variables are a good determinant of Ethiopian commercial banks' lending behavior.

4.4.2. Industry Specific Determinants

Cash Reserve Requirement Ratio

It is one of the monetary policy instruments which bring a positive statistically insignificant relationship with loans and advances. The beta coefficient and t-statistics are 29.621 and 1.86 respectively. This positive relationship between cash reserve requirement ratio and commercial bank loans and advance implies that as Commercial bank loans and advances increases, cash reserve requirement ratio also increases overtime. The t-statistics of the parameter shows that it is statistically insignificant at all (1%, 5% & 10%) level of significance and this indicates that the parameter cash reserve requirement ratio is not a good explanatory variable. Therefore, the null hypothesis "there is no significant relationship between commercial banks' lending and cash reserve requirement ratio" is accepted while the alternative hypotheses is rejected.

The coefficient value revealed that a one unit change in cash reserve requirement ratio will lead to 29.621 units change in volume of loans and advances in the same direction.

Therefore, the result shows that reserve requirement change has little impact on bank loans and advances of commercial banks and it have no substantial value during the sample period. That is why it found insignificant to influence bank credit. Conversely, the positive sign for reserve requirement contradict the loanable funds theory i.e. "for a given monetary base, broad money will decrease with higher reserve requirements," (Glocker & Towbin, 2011) and most empirical study. However, the implication is that cash reserve requirement ratio does not impact negatively on banks' lending behavior. The possible argument of positive relationship indicates that high cash reserve requirement ratio of commercial banks may not necessarily translate into poor lending performance lower proportion of commercial banks' funds available for lending. The implies that reserve requirement increases may not be able to cool down the economy and thereby also do not lower credit supply in Ethiopian for the study period. The other implication may, according to Demirgüç and Huizinga (as cited in Assefa, 2014) if banks income could be higher and the funds lend out instead of reserved, leads to increase their loans and advances given to the needed party's.

The result of this paper is in line with Olokoyo (2011); Malede (2014); Assefa (2014) and Araga (2014) which found insignificant impact; additionally it is aligned with Olusanya et al. (2012) but they found statistically significant result at 5% level of significance.

Lending Rate

The result of the regression of interest (lending) rate shows a p-value of 0.014, and this value shows that it is statistically significant at 5% level of significance. Thus based on this statistical value the study fails to accept the null hypothesis and going to agree to take the alternative one i.e. "there is a significant impact of lending rate on Ethiopian commercial banks' lending behavior." This revealed that Ethiopian commercial banks are highly influenced by interest (lending) rate. Hence, it can be concluded that lending interest rate is a good explanatory variable for Ethiopian commercial banks loans and advances. On the other hand the coefficient value indicates that commercial bank lending and lending rate are positively related. It reveal that a one unit change in lending rate will cause their loan and advance to change by 0.242 units in the same direction. This positive sign of the coefficient indicates that high lending rate of commercial banks may not necessarily

translate into poor lending performance, or if both deposit and lending rates rise by the same amount. On the other hand they maybe lend out for who have huge collateral and due to this on average they did not set high interest rate. As a result directly interest rate did not impact commercial banks' loan supply negatively. In respect to positive relationship the finding is similar with Olokoyo (2011); Assefa (2014); and Malede (2014); however the study of Olokoyo (2011) and Malede (2014) shows a statistically insignificant relationship with banks' lending.

In general, industry specific determinants i.e. lending interest rate and cash reserve requirement ratio have positive/direct functional relationship with commercial banks' loans and advances. Cash reserve requirement ratio is not statistically significant and do not strongly explain the dependent variable, on the other hand lending interest rate is statistically significant which means a good explanatory variable. Therefore, because of the positive relationship that exist between these policies and bank lending, there is need to ensure that this policies are implemented with needed promptness for the effects to be felt on time.

4.4.3. Macroeconomic Determinants

Gross Domestic Product

As shown from the above table 4.6, the coefficient of real GDP growth rate is -0.293, and this revealed that GDP and commercial banks' lending have an inverse relationship. This implies that for one unit change in GDP, keeping other things constant had resulted 0.293 unit changes on volume of commercial bank loans and advances in opposite direction. However, the p-value of the parameter is 0.259 and this denotes that GDP is not statistically significant at 1%, 5% & 10% significance levels over the study period. Based on the statistical value null hypothesis III "there is no significance relationship between commercial bank loans and advance and GDP growth rate" was failed to reject since it is statistically insignificant. Thus, GDP is not a good determinant for Ethiopian commercial banks' lending for the study period. However, according to Tomak (2013) the insignificancy of GDP can be explained by firms' high demand for credit or financial constraints and supply side constraints in credit to firms. Hence, it can be conclude that

Ethiopian commercial banks' lending is less dependent on the business cycle. This revealed that the lenders expectations do not depend on current phase of business activities.

This result is agreed with Tomak (2013) and Ladime et al. (2013) which founds an inverse and statistically insignificant relation between private bank lending and GDP.

Foreign Exchange Rate

The average annual exchange rate of birr to USD has a beta coefficient of -0.158 and p-value of 0.071. The coefficient value indicates that foreign exchange rate have a negative/inverse association with Ethiopian commercial banks' loans and advances. The implication of this result is that as foreign exchange rate increases, Ethiopian commercial bank lending decreases. As presented from the result, a one unit change in foreign exchange rate leads banks loans and advances to change in 0.158 units in opposite direction. Even though, the statistical value of the parameter shows that it is statistically insignificant at 5% level of significance but it is significant 90% confidence interval. Thus, this shows that foreign exchange rate is not much good explanatory variable and it is poor to affect Ethiopian commercial banks' lending behavior. The possible explanation of the negative sign of the coefficient is an indication of depreciation of domestic currency (Birr) against foreign currency and it tends to reduce the volume of loans and advances made by commercial banks. The result is in line with Ladime et al. (2013) which found negative and statistically significant at all levels of confidence of foreign exchange rate on banks' lending performance in Ghanaian case.

The fixed effect regression result shows macroeconomic variables have a negative/inverse relationship with Ethiopian commercial banks' loans and advances. Still, in spite of their relationship these macroeconomic factors are alike insignificant at 5% significance level, this implies they are not relevant to influence banks' loan supply. However annual foreign exchange rate to USD is significant at 10% significance level and this revealed that it is good explanatory variables with compared to GDP.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The study empirically identified the factors that determine the lending behavior of Ethiopian commercial banks by using panel data of eight banks over the period from 2004 to 2013. The paper investigated bank specific (credit risk, liquidity ratio, volume of deposits and banks' capital), industry specific (lending rate and cash reserve requirement) and macroeconomic (GDP and annual foreign exchange rate to USD) factors of commercial banks which affect commercial banks' lending behavior. Fixed effect regression method of estimation was made by using STATA package 13.

The regression result revealed that about 92.33% of the systematic variation in the dependent variable is explained by eight independent variables such as credit risk, liquidity ratio, volume of deposits, banks' capital, lending rate, cash reserve requirement, Real GDP growth rate and annual foreign exchange rate to USD. The F- statistics is significant at the 5% level showing that there is a linear relationship between loans and advances and the whole independent variables used in the regression.

From the regression it is found that internal factors i.e. credit risk, liquidity ratio, volume of deposits and banks' capital have a significant impact on Ethiopian commercial banks' lending behavior. Among these bank specific factors except volume of deposit which has a positive impact on banks' lending, other internal factors (credit risk, liquidity ratio and bank capital) have an inverse/negative impact on Ethiopian commercial banks' lending behavior over the study period. More so, around 45.49% of the variation of Ethiopian commercial banks' lending is due to internal (bank specific) factors. This indicates that the lending behavior of Ethiopian commercial banks is mainly affected by the internal factors which the management of the bank has control over.

Surprisingly industry specific factors of banks are positively related with of Ethiopian commercial banks' lending behaviors. However, cash reserve requirement ratios have no

significant impact since it is statistically insignificant at all significance levels. The implied argument is that reserve requirement increases may not be able to cool down the economy and thereby also do not lower credit supply in Ethiopian for the study period. In addition to this, due to the increment of banks income overtime banks lend more their income rather to reserve and impacts of reserve requirement ratio is too small and have no significant impact. On the other hand average lending rate has a significant impact on banks' lending in Ethiopia.

Macroeconomic determinants (GDP and annual foreign exchange rate of Birr to USD) are negatively/inversely related with commercial banks loans and advances. Nevertheless, as the regression result shows GDP is not good explanatory variable for Ethiopian commercial banks' lending. This may be due to less sensitiveness of Ethiopian commercial banks' lending to real GDP growth rate over the study period. Whereas, foreign exchange rate has a little impact on banks' loans and advances in Ethiopia since it is significant at 10% significance level. The negative sign of the coefficient is an indication of depreciation of domestic currency against foreign currency and it tends to reduce the volume of loans and advances made by commercial banks.

Generally, the study found that credit risk, liquidity ratio, lending rate, volume of deposit and bank capital are the main determinants lending behaviors of commercial banks in Ethiopia. As well foreign exchange rate have relatively little impact with compared to the above significant factors. However, real GDP growth rate and cash reserve requirement ratio did not explain Ethiopian commercial banks' lending behavior during the study period. Among all explanatory variables credit risk is the most determinant which have a beta coefficient of -12.055, and this portray that a one unit increase in credit risk will lead to decrease commercial banks loan and advances by 12.055 units.

5.2. Recommendations

Banking industry, key players of the economy, is dominant in Ethiopian financial system in terms of deposit mobilization, share capital, asset size and loan service. Their total loans and advances, a major source of their income, allowed to businesses is increased overtime. However, this major source of income for commercial banks and means for economy development is affected by different factors. In view of this, identifying the major factors of loans and advances on Ethiopian commercial banks is a required. Therefore, the study aims to examine the major determinants of loans and advances of commercial banks in Ethiopia. Based on the main findings of the study, the study wishes to forward the following suggestions.

- ♠ Ethiopian commercial banks have to give emphasis on managing their internal factors to achieve better lending performance because the variation of their loans and advance is mainly due to these endogenous factors.
- ♠ Ethiopian commercial banks better to give emphasis and employ various strategies to attract and seize deposits such as driving up deposit rates and giving different incentives so as to entice depositors since it is the main source of loans and advances.
- ♠ Credit risk is the main factor that has a great impact on Ethiopian banks. High and consistent NPL will erode a bank capital adequacy, diminish its profitability and ultimately affects its intermediation function. So, banks should establish applicable credit policies and arrangements, and critically consider the creditworthiness and performing ability of their debtors.
- ♠ Ethiopian commercial banks' capital has a negative impact on their lending performance. This is because commercial banks reserve much capital which is more than required to reserve. Thus, it is recommended that commercial banks better to finance excess capital in profitable area of business rather to reserve beyond their requirement.

- There should develop competent and proficient liquidity, credit risk and foreign exchange exposure management systems so as to diminish their negative impact on the lending performances.
- The positive sign of cash reserve requirement ratio shows positive relation between cash reserve ratio and loans and advances. In order to fulfill the reserve requirements without reducing credit extended, banks need to attract more deposits, by drive up deposit rates.
- Because of the positive relationship that exist between bank lending with lending rate and cash reserve requirement ratio, there is need to ensure that this policies are always implemented with needed promptness for the effects to be felt on time.
- Policy makers of the government should formulate savings attractive policies to attract savings, source of investment, which enhance the liquidity position of the banks and their lending performance.

5.3. Suggestion for Further Research

The scope of the study was limited to examine the determinants of Ethiopian commercial banks' lending behavior on supply side. As a result it is failed to investigate demand factors of Ethiopian commercial banks' lending. Besides it was failed to consider the ownership impact on lending behavior of Ethiopian banks. Therefore, studying by considering both supply and demand side factors with a dummy variable of ownership may give a full result.

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APPENDIXES

Appendix 1: ***Multiple Regression Test using Variance Inflation Factor***

Variable	VIF	1/VIF
vd	6.91	0.144650
bc	5.88	0.169991
fx	2.81	0.356052
gdp	2.71	0.368609
crr	2.58	0.386983
air	2.42	0.413227
lr	1.82	0.548690
cr	1.68	0.595362
Mean VIF	3.35	

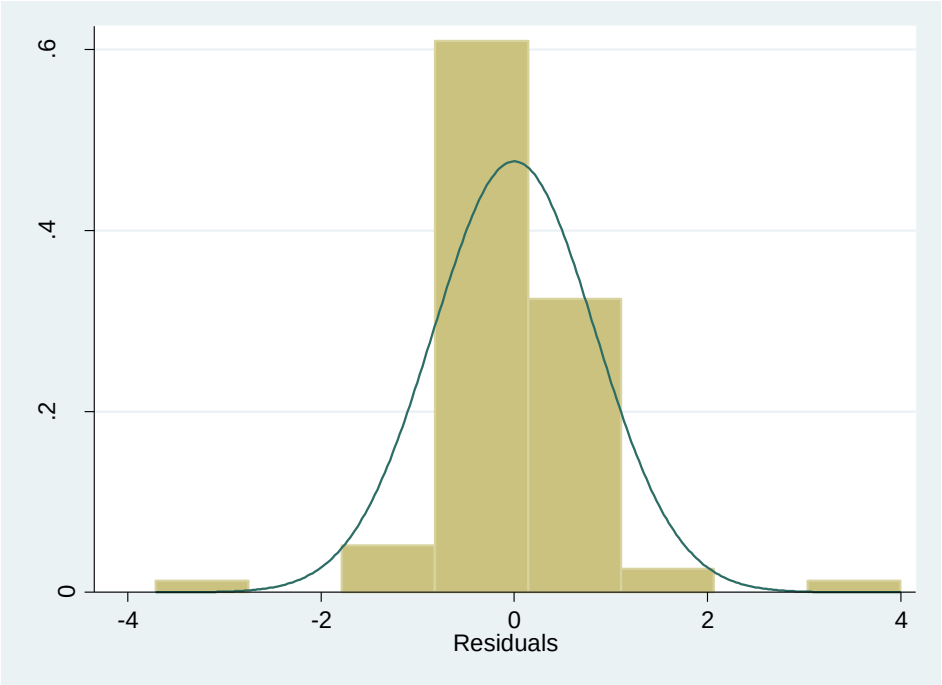
VIF greater than 10 and 1/VIF is less than 0.10 indicates the presence of multicollinearity. The result shows that, no multicollinearity problem since VIF less than 10 and 1/VIF is greater than 0.1.

Appendix 2: ***Ramsey Test for Model Specification***

```
Ramsey RESET test using powers of the fitted values of loa

       Ho:  model has no omitted variables

                  F(3, 68) =     13.73

                  Prob > F =      0.0000
```

Ramsey reset test is significant at 1% level of significance; accordingly, it can conclude that there are some factors which are not included in the model.

Appendix 3: Normal probability plot



The normal probability plot shows that the curve is bell shaped and this indicates that residuals are normally distributed with mean zero.

Declaration

I, Ayitenew Temesgen, declare that the thesis comprises my own work. In compliance with internationally accepted practices, I have duly acknowledged and referenced all materials used in this work. I understand that non-adherence to the principles of academic honesty and integrity, misrepresentation/fabrication of any idea/data/fact/source will constitute sufficient ground for disciplinary action by the University and can also evoke penal action from the sources which have not been properly cited or acknowledged.

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Signature

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Name of Student

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University Id. Number

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Date